

CLAIMS

1. An optical receiver preamplifier, comprising:

an inverting amplifier; and

a current-voltage conversion element connected between input and output terminals

5 of the inverting amplifier,

wherein the inverting amplifier includes a first transistor having a gate connected to the input terminal of the inverting amplifier, a second transistor having a source connected to a drain of the first transistor and a gate to which a predetermined voltage is applied, and a load connected to a drain of the second transistor, and

10 wherein the optical receiver preamplifier further includes a third transistor connected between the input terminal of the inverting amplifier and the source of the second transistor.

2. The optical receiver preamplifier of claim 1, wherein the predetermined voltage applied to the gate of the second transistor is controlled so that an input terminal voltage of the inverting amplifier and a source voltage of the second transistor agree with each other.

3. The optical receiver preamplifier of claim 2, further comprising an operational amplifier having an inverting input terminal connected to the source of the second transistor, a non-inverting input terminal connected to the input terminal of the inverting amplifier and an output terminal connected to the gate of the second transistor.

4. The optical receiver preamplifier of claim 2, further comprising:
an operational amplifier having an inverting input terminal connected to the source
25 of the second transistor and an output terminal connected to the gate of the second

transistor; and

a voltage generator circuit for outputting a voltage of the same level as that of the input terminal voltage of the inverting amplifier, the voltage generator circuit having an output terminal connected to the non-inverting input terminal of the operational amplifier.

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5. The optical receiver preamplifier of claim 1, further comprising:

a switch group including a plurality of switches, each being connected to the gate of the third transistor; and

a plurality of voltage sources connected to the switches constituting the switch
10 group, respectively,

wherein a voltage selected from respective output voltages of the plurality of voltage sources by the switch group is applied to the gate of the third transistor.

6. The optical receiver preamplifier of claim 5, further comprising a comparator
15 group including at least one comparator having one input terminal to which a voltage output from the inverting amplifier is applied and the other input terminal to which a predetermined voltage is applied,

wherein, based on a comparison result of the comparator group, the switch group is controlled.

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7. The optical receiver preamplifier of claim 5, further comprising:

a fourth transistor having a source connected to the input terminal of the inverting amplifier and a gate connected to the output terminal of the inverting amplifier,

another current-voltage conversion element connected to a drain of the fourth
25 transistor; and

a comparator group including at least one comparator having one input terminal to which a voltage applied to said another current-voltage conversion element is applied and the other input terminal to which a predetermined voltage is applied,

wherein, based on a comparison result of the comparator group, the switch group is
5 controlled.

8. The optical receiver preamplifier of claim 1, wherein the third transistor is provided plural in number,

wherein the optical receiver preamplifier further includes a switch group having a
10 plurality of switches, each being connected to a gate of each of the third transistors, and a plurality of voltage sources connected to the switches constituting the switch group, respectively, and

wherein a voltage selected from respective output voltages of the plurality of voltage sources by the switch group is applied to a gate of each of the third transistors.

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9. The optical receiver preamplifier of claim 8, further comprising a comparator group including at least one comparator having one input terminal to which a voltage output from the inverting amplifier is applied and the other input terminal to which a predetermined voltage is applied,

20 wherein, based on a comparison result of the comparator group, the switch group is controlled.

10. The optical receiver preamplifier of claim 8, further comprising:

a fourth transistor having a source connected to the input terminal of the inverting
25 amplifier and a gate connected to an output terminal of the inverting amplifier;

another current-voltage conversion element connected to a drain of the fourth transistor; and

a comparator group including at least one comparator having one input terminal to which a voltage applied to said another current-voltage conversion element is applied and
5 the other input terminal to which a predetermined voltage is applied,

wherein, based on a comparison result of the comparator group, the switch group is controlled.

11. The optical receiver preamplifier of claim 1, further comprising an amplitude
10 detector circuit for outputting a voltage according to an amplitude of a signal input to the input terminal, the amplitude detector circuit having an input terminal connected to the output terminal of the inverting amplifier,

wherein a voltage output from the amplitude detector circuit is applied to a gate of the third transistor.

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12. The optical receiver preamplifier of claim 1, wherein each of the first transistor and the second transistor is a bipolar transistor.

13. An optical communication receiver which includes the optical receiver
20 preamplifier of claim 1, the optical communication receiver comprising a photo diode for converting an optical signal transmitted through an optical fiber to a current signal,

wherein the current signal is converted to a voltage signal by the optical receiver preamplifier.

25 14. An optical detector which includes the optical receiver preamplifier of claim 1,

the optical detector comprising a photo diode for converting a light signal obtained by condensing light to a current signal,

wherein the current signal is converted to a voltage signal by the optical receiver preamplifier.